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Remarks and Instructions

The complete manual, revision packages, and individual chapters can be accessed at www.wsdot.wa.gov/publications/manuals/m46-01.htm.

Please contact Linda Hughes at 360-709-5412 or hughel@wsdot.wa.gov with comments, questions, or suggestions for improvement to the manual.

For updating printed manuals, page numbers indicating portions of the manual that are to be removed and replaced are shown below.

Chapter	Remove Pages	Insert Pages
Title Page	i – ii	i – ii
T 127 Preparation of Leachate Sample for Testing Toxicity of HECP Effluents	1 – 2	1 – 2
T 606 Method of Test for Compaction Control of Granular Materials	3 – 6	3 – 6

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Approved By

Signature

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Engineering and Regional Operations
Materials Laboratory

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WSDOT Test Method T 127

Preparation of Leachate Sample for Testing Toxicity of HECP Effluents

1. Scope

   This test method outlines the procedure for collecting leachate from a HECP sample.

2. References

   2.1 EPA-821-R-02-012 Methods for Measuring Acute Toxicity of Effluents

3. Preparation of the HECP Sample

   3.1 Lay cheesecloth over clean topsoil

   3.2 Apply the HECP to the cheesecloth at the following coverage:

   3.2.1 HECP Long-Term or Moderate-Term Mulch 3,500 lbs per acre in two lifts with no more than 2000# per acre in any one lift.

   3.2.2 HECP Short-Term Mulch 2000# per acre minimum, or manufacturer's recommended rate may be used.

   3.3 Allow material to cure for 48 hours

   3.4 Pull cheesecloth up with mat of HECP, brush off any soil

   3.5 Cut HECP into squares and provide 1.02 pounds of HECP to the laboratory.

4. Preparation of the Leachate (done by the laboratory)

   4.1 Allow hydromulch product to soak in water for one hour

   4.2 Remove hydromulch sheet from water

   4.3 Filter water through a 60 micron filter – water may be pre-filtered through a 35 mesh and then a 120 mesh before using the 230 mesh/63 micron filter.

   Note: Leachate not immediately used for testing should be stored at 4° C in the dark until use.

   4.4 Test leachate according to EPA-821-R-02-012 Methods for Measuring Acute Toxicity of Effluents.

Test Selection Table 1

Fine Aggregate Split of Original Sample	
Soil Type	**Test Method**
Sandy, Non-plastic, permeable soils or non-cohesive soils.	T606 Test 1
Silt, some plasticity, low permeability	T 99 Method A
Sandy/silt, some plasticity, permeable	T606 Test1/T99 Method A (use highest results)
Coarse Aggregate Slit of Original Sample	
No more than 15 percent by weight of the original aggregate specimen exceeds ¾ in	T606 Test 2 Procedure 1
15 percent or more by weight of the original aggregate specimen is greater than ¾ in. (19 mm), but does not exceed 3 in. (76 mm)	T606 Test 2 Procedure 2

7. Sampling Material

7.1 Sample the material in accordance with WSDOT FOP for AASHTO T 2.

7.2 Native soils within the contract limits to be used for embankment construction and/or backfill material do not require sampling by a qualified tester.

7.3 For material that requires gradation testing such as but not limited to manufactured aggregates and gravel borrow, sampling shall be performed by a qualified testers.

8. Sample Preparation

8.1 Prepare the field sample by splitting out a representative portion in accordance with WSDOT FOP for AASHTO T 248.

8.2 Dry the compaction sample to constant mass in accordance with WSDOT FOP for AASHTO T 255.

8.3 Scalp the plus 75mm (3 inch) material from the compaction sample and discard, if not required for other tests. Separate the remainder of the compaction sample into coarse [minus 3 inch (75mm) to No. 4 (4.75mm)] and fine [minus No. 4 (4.75mm)] aggregate portions.

8.4 The quantity of material necessary to complete tests on both fractions is:

8.4.1 Fine aggregate, minimum of 3 portions approximately 13 lb (6 kg) each.

8.5 Coarse aggregate:

8.5.1 For material containing 15 percent or less of ¾ inch (19 mm) material, a portion of the minus ¾ inch (19.0mm) aggregate of approximately 13 lbs (6 kg).

8.5.2 For material containing more than 15 percent plus ¾ in (19.0 mm) aggregate, a portion of 40 to 45 lb (18 to 20 kg).

9. Procedure

9.1 Test No. 1 – Compaction Test of the Fine Fraction (No. 4 minus material)

9.1.1 Assemble the small mold and determine its mass, along with the piston, to the nearest 0.01 lb (5g). Record this as the Mass of Mold Assembly.

9.1.2 Using one of the fine aggregate portions, add an amount of water estimated to produce a saturated sample when compacted and mix thoroughly.

Note 1: When the material is at its saturation point, free water (a drop or two) will show at the base of the mold at about the 500 lb (227 kg) load of the first compression run. The ideal saturation point would be a bead of water around the base of the mold at the end of the 10-minute compaction run. Most materials will yield the highest density at that moisture content. Some materials may continue to gain density at higher moisture contents; however, this is due to the washing out of fines, which will alter the character of the sample. Therefore, if severe washing-out or pumping of fines occurs (as evidenced by dirty water flooding off of the base or pumped on top of the piston), the sample is beyond the saturation point, will be discarded and a lower moisture content tried for the saturation point.

9.1.3 Set the piston aside and place the sample in the mold in three approximately equal layers. Consolidate each lift by 25 strokes of the tamping rod followed by 25 blows of the manual rammer. The surface of the top lift should be finished as level as possible.

9.1.4 Place the piston on top of the sample and mount the mold on the jack platform in the compactor. Spacers between the load spring and piston must be used to adjust the elevation of the mold so the hammers strike the mold in the center of the lift area. Elevate the mold until the loading head seats on top of the piston. Apply an initial seating load of approximately 100 lbs on the sample.

9.1.5 Start the compactor hammers and, by elevating the jack, begin the loading procedure. The load is applied as follows:

Load Application Rate	
Load	Time
0 to 500 lb	1 minute
500 lb to 1,000 lb	30 sec
1000 lb to 2,000 lb	30 sec

9.1.6 Upon reaching the 2,000 lb load at the end of the 2-minute cycle, stop the hammers, release the load on the jack, and return to zero pressure.

9.1.7 Repeat Steps 9.1.4 through 9.1.6 four additional times. After the last run, remove the mold from the compactor.

9.1.8 Measure the height of the compacted sample to the nearest 0.01 in (0.1 mm). Record as the Depth.

9.1.9 Determine the mass of the specimen in the mold to the nearest 0.01 lb (5g). Record this as:

Mass of Mold + Sample

9.1.10 Remove the specimen from the mold and determine the moisture content in accordance with WSDOT FOP for AASHTO T 255.

9.1.11 Vertically slice through the center of the specimen, take a representative specimen (at least 1.1 lbs (500 g)) of the materials from one of the cut faces (using the entire specimen is acceptable), weigh immediately, and dry in accordance with AASHTO T 255 to determine the moisture content, and record the results.

9.1.12 Calculate and record the dry density of fine fraction.

9.2 Test No. 2 – Compaction Test of the Coarse Fraction

9.2.1 Procedure 1 – Minus ¾ in (19 mm) Aggregates

9.2.1.1 Determine the mass of the coarse aggregate to the nearest 0.01 lb (5g).

9.2.1.2 Add 2.5 percent moisture to the sample, mix thoroughly.

9.2.1.3 Place in 0.1 ft^3 (0.0028 m^3) mold in approximately three equal lifts. Compact each lift with 25 blows of the tamping rod (omit rodding). Avoid the loss of any material during placement.

9.2.1.4 Follow steps 9.1.4 through 9.1.8.

9.2.1.5 Calculate and record the dry density of coarse fraction.

9.2.2 Procedure 2 – Plus ¾ in (19 mm) Aggregates

9.2.2.1 Determine the mass of the coarse aggregate to the nearest 0.01 lb (5g) or better.

9.2.2.2 Divide the sample into five representative, approximately equal portions.

9.2.2.3 Place one of the portions into the ½ ft^3 (0.014 m^3) mold and level the surface.

9.2.2.4 Position the piston on the material, mount the mold in the compactor, and compact as described in steps 9.1.4 through 9.1.6.

Note: Spacers may be needed between the load spring and piston to adjust the elevation of the mold to the height of the lift being compacted.

9.2.2.5 Repeat 9.2.2.3 and 9.2.2.4 for the remaining four portions of material.

9.2.2.6 After the final portion is compacted, determine the height of the compacted sample.

9.2.2.7 Calculate and record the dry density of coarse fraction (see Calculations section).

9.3 Test No. 3 – Specific Gravity Determination for Maximum Density Test

9.3.1 Material

9.3.1.1 Fine fraction U.S. No. 4 (4.75 mm) minus 1.1 lbs (500 g) minimum.

9.3.1.2 Coarse fraction U.S. No. 4 (4.75 mm) plus 2.2 lbs (1,000 g) minimum.

9.3.2 Procedure

9.3.2.1 Place dry materials, either fine or coarse fraction, in pycnometer, add water.

9.3.2.2 Put pycnometer jar top in place and connect to vacuum apparatus.

9.3.2.3 Apply vacuum for at a minimum of 20 minutes until air is removed from sample. Slight agitation of the jar every 2 to 5 minutes will aid the de-airing process. If the material boils too vigorously, reduce the vacuum.

9.3.2.4 Remove vacuum apparatus, fill pycnometer with water, dry outside of jar carefully and weigh.

9.3.2.5 Water temperature during test should be maintained as close to 68° ± 1°F (20° ± 0.5°C) as possible.

Calculations

10. Determine the dry density of each of the fine aggregate points as follows

10.1 Calculate Specific Gravity as follows:

$$\text{Sp. Gr.} = \frac{a}{(a+b-c)}$$

Where:

a = Weight of dry material, grams
b = Weight of pycnometer + water, grams
c = Weight of pycnometer + material + water, grams

10.2 Calculate the wet sample weight:

$$e = c - d$$

Where:

e = Wet sample weight, g
c = mold and sample weight
d = Tare of mold assembly